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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/489,954 01/24/00 FAZAN P 303.434US2

021186 MM92/1208
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P.O. BOX 2938
MINNEAPOLIS MN 55402

EXAMINER

KANG, D

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 12/08/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/489,954

Applicant(s)

FAZAN ET AL.

Examiner

Donghee Kang

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-57 is/are pending in the application.
- 4a) Of the above claim(s) 58-88 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 28-57 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

DETAILED ACTION

1. Receipt is acknowledged of the Pre-Amendment filed Oct. 13, 2000

Election/Restrictions

2. Applicant's election without traverse of Group I (claims 28-57) in Paper No. 7 is acknowledged.

Drawings

3. Figure 1-11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims **28, 31, 34, 39, 48, 51** and **56** are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification recites "the third portion overlying second portion and a portion of insulative layer". There is no support in the specification and drawing.

6. Claims **42-43** and **57** are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time

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the application was filed, had possession of the claimed invention. The specification recites "fourth portion interposed between said first and said second portions" in claim 42, "fourth portion reduces contact resistance between first and second portion" in claim 43, and "a reducing contact resistance portion interposed between said contact and diffusion barrier portion" in claim 57. There is no support in the specification.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

8. Claims **28 - 41, 44 - 46, and 48 - 56** are rejected under 35 U.S.C. 102(b) as being anticipated by Shinkawata (US 5,796,136).

Regarding claims **28** and **39**, Shinkawata discloses an electrode comprising (Fig.1):

a first portion (12 a) formed in an insulative layer (18); a second portion (12 b) overlying the first portion, wherein said insulative layer (18) surrounds a sidewall of said second portion; and a third portion (13) overlying said second portion, wherein said first portion (Ti) and said second portion (TiN) are different materials. See also Col.6, lines 59-63. Shinkawata does not show electrode 12 including a Ti/TiN stack film in Fig.1 but he teaches in Col.6, lines 59-63 the electrode 12 is a Ti/TiN stack film.

Regarding claims **29** and **40**, Shinkawata discloses a second portion (TiN) and third portion (Pt) are different materials.

Regarding claims **30** and **41**, Shinkawata discloses a first portion (Ti) and third portion (Pt) are different materials.

Regarding claims **31**, **34**, **48**, and **51**, Shinkawata discloses a dynamic random access memory device comprising:

an electrode which comprises: a first portion (12 a) formed in an insulative layer (18); a second portion (12 b) overlying the first portion, wherein said insulative layer (18) surrounds a sidewall of said second portion; and a third portion (13) overlying said second portion, wherein said first portion (Ti) and said second portion (TiN) are different materials. See also Col.6, lines 59-61. Shinkawata does not show electrode 12 including a Ti/TiN stack film in Fig.1 but he teaches in Col.6, lines 59-63 the electrode 12 is a Ti/TiN stack film.

Regarding claims **32** **35**, **49**, and **52**, Shinkawata discloses a second portion (TiN) and third portion (Pt) are different materials.

Regarding claims **33**, **36**, **50**, and **53**, Shinkawata discloses a first portion (Ti) and third portion (Pt) are different materials.

Regarding claims **37** and **55**, Shinkawata discloses the dynamic random access memory device further comprising a transistor (Fig.1).

Regarding claims **38** and **54**, Shinkawata discloses the dynamic random access memory device further comprising:

a dielectric layer (14) overlying said third portion; and a cell plate electrode (15) overlying said dielectric layer.

Regarding claim **44**, Shinkawata discloses the first portion (12 a) is a silicon contact.

Regarding claim **45**, Shinkawata discloses the second portion (12 b) is a diffusion barrier layer prohibiting diffusion of atoms between said first and said second portions.

Regarding claim **46**, Shinkawata discloses the third portion is an oxidation resistant layer (Pt).

Regarding claim **56**, Shinkawata discloses an electrode comprising (Fig.1):
a contact (12 a) formed in an insulative layer; a diffusion barrier layer (12 b) portion overlying said contact, said insulative layer surrounding a sidewall of said diffusion barrier portion; and an oxidation resistant portion (13) overlying said diffusion barrier portion, wherein diffusion barrier portion (12 b) configured to inhibit diffusion of atoms between contact (12 a) and oxidation resistant portion (13). Shinkawata does not show electrode 12 including a Ti/TiN stack film in Fig.1 but he teaches in Col.6, lines 59-63 the electrode 12 is a Ti/TiN stack film.

9. Claims **28-30**, **39-41**, **44-46**, and **56** are rejected under 35 U.S.C. 102(e) as being anticipated by Roh (US 6,071,770).

Regarding claims **28** and **39**, Roh discloses an electrode comprising (Fig.4f):
a first portion (24) formed in an insulative layer (21); a second portion (26) overlying the first portion, wherein said insulative layer (21) surrounds a sidewall of said second portion; and a third portion (27) overlying said second portion and at least a

portion of insulative layer, wherein said first portion (W) and said second portion (TiW) are different materials. See also Col.5, lines 30-61.

Regarding claims **29** and **40**, Roh discloses a second portion (TiW) and third portion (Pt) are different materials.

Regarding claims **30** and **41**, Roh discloses a first portion (W) and third portion (Pt) are different materials.

Regarding claim **44**, Roh discloses the first portion (24) is a silicon contact.

Regarding claim **45**, Roh discloses the second portion (26) is a diffusion barrier layer prohibiting diffusion of atoms between said first and said second portions.

Regarding claim **46**, Roh discloses the third portion is an oxidation resistant layer (Pt).

Regarding claim **56**, Roh discloses an electrode comprising (Fig.4f):

a contact (24) formed in an insulative layer (21); a diffusion barrier layer (26) portion overlying said contact, said insulative layer surrounding a sidewall of said diffusion barrier portion; and an oxidation resistant portion (27) overlying said diffusion barrier portion and extending above an upper surface of insulative layer (21), wherein diffusion barrier portion (26) configured to inhibit diffusion of atoms between contact (24) and oxidation resistant portion (27).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinkawata in view of Ma et al (US 5,973,344).

Shinkawata teaches all claimed invention except for insulative layer surrounds a lower sidewall of electrode. However, Ma et al teaches lower sidewall of bottom electrode 22 is surrounded by insulative layer 18 (Fig.3). It would have been obvious to one having the skill in the art at the time the invention was made to form lower electrode in the insulating layer in order to make a capacitor in memory device.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Donghee Kang** whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

DHK
December 6, 2000

Tom Thomas